

Part 2 - Tier 2 Training Initiatives

Tier 2 initiatives are the service area initiatives contained in the *National Aviation Weather Initiatives* published in 1999. The majority of these initiatives deal with new products, procedures, forecasts, observations, etc. but five deal specifically with training. These training initiatives are in the ceiling and visibility, ground de-icing, in-flight icing, and turbulence service areas. Although an initial assessment was made for the Tier 3/4 baseline report, this follow-up review provides additional training information and therefore provides an opportunity for a more detailed assessment. One objective of this review is to assess how well the Tier 2 training initiatives are being satisfied by either a specific Tier 3/4 program or by possible modifications to the training associated with other Tier 3/4 programs.

Service Area (1): Ceiling & Visibility
Initiative #4: Training on Rapidly Changing Ceiling & Visibility for Air Traffic Control, Airline Operations Centers, and Pilots

The first Tier 2 training initiative deals with training on rapidly changing ceiling and visibility conditions for various users of aviation weather information including pilots. This is especially important in the general aviation community where accidents resulting from VFR flight into IFR conditions continues to be a problem. In the initial assessment of the Tier 3/4 programs as depicted in Table 1, column 2, it appeared that one program (IND-18) partially supported this initiative. This is an outreach program associated with the Aircraft Owners and Pilots Association's Air Safety Foundation. This program includes the development and

Service Area (1): Ceiling & Visibility												TABLE 1		
Programs Related to C&V	Training component supports initiative?			If no, could it be modified to support initiative?			Training Status			Designated Trainees			Possible Modifications	
	yes	no	partial	yes	no	possibly	Implmntd	Under Dev	Other	ATC	AOC	Pilots		Other
FAA-4 ADDS		X				X	X				X		X	Expand Web Tutorial to include C&V
FAA-11 SFO		X			X		X				X			
FAA-19 ITWS		X			X		X				X			
FAA-23 OASIS		X			X		X				X			
NASA-4 E&T		X				X	X					X		Expand to Include C&V
NASA-6 AWIN		X			X			X				X		
NOAA-2 ASOS		X			X		X				X		X	
NOAA-3 LCP		X			X			X					X	
NOAA-12 DCAFS		X			X				X				X	
NOAA-14 PACE		X			X			X			X			
AF-1 CDFS-II		X			X		X						X	
AF-2 OS-21		X			X			X					X	
AF-3 TACMET		X			X		X						X	
AF-8 N-TFS		X			X		X				X		X	
USN-1 C&V		X			X			X			X		X	
IND-11 AWARE		X				X		X					X	Include Module on C&V
IND-18 Pilot Ed			X				X						X	Expand Segment Dealing With C&V

distribution of a video for general aviation pilots on using IFR skills within the Air Traffic Control system.

As the result of this follow-on training review (Table 1, Column 3), it appears that the training component of three additional programs, with some modifications, could provide useful training in this area. The Aviation Weather Center’s Aviation Digital Data Service (ADDS) provides digital and graphical analyses, forecasts, and observations to the aviation community. An expansion of ADDS’ web-based tutorial to include ceiling and visibility training could assist in meeting this initiative. NASA’s Education and Training Element (part of NASA’s Aircraft Icing Project) develops various training materials suitable for distance learning as well as classroom and self-paced instruction. To date the focus has been on in-flight icing but with a slight change of direction, this might be a suitable format for ceiling and visibility training as well. Industry’s Aviation Weather Awareness and Reporting Enhancement (AWARE) program, a Cooperative Research Agreement with NASA, is aimed at improving pilot situational awareness by making available flight plan relevant graphical and text-based weather information. Again, with some modification, AWARE might provide an opportunity for additional training on changing ceiling and visibility conditions.

**Service Area (4): Ground De-Icing and Anti-Icing
Initiative #3: Training on Ground De-Icing For ATC, Pilots, and Ground Crews**

The second Tier 2 training initiative deals with training on ground de-icing and anti-icing for air traffic controllers, pilots, and ground crews. In the initial assessment of the Tier 3/4 programs (Table 2, Column 2), no programs were found to support this initiative. As a result of this follow-on training review (Table 2, Column 3), the FAA’s Weather Support to Ground De-Icing Decision Making (WSDDM) and Industry’s Forecasting for De-Icing (FFDI) program appear to be good candidates for leveraging to help support this initiative. WSDDM provides information to airport decision makers concerning aircraft ground de-icing and surface clearing operations. The WSDDM training is geared for airport personnel and focuses on the ground de-icing. However, this training component appears to have the potential of further supporting this initiative if the training is modified and tailored to meet the needs of all users. Industry’s FFDI program forecasts rime ice on descent as well as conditions requiring airport de-icing

Service Area (4): Ground De-Icing and Anti-Icing							TABLE 2							
Programs Related to Ground De-Icing	Training Component Supports Initiative?			If no, could it be modified to support initiative?			Training Status			Designated Trainees				Possible Modifications
	yes	no	partial	yes	no	possibly	Implemented	UnderDev	Other	ATC	Grnd Crew	Pilots	Other	
FAA-13 WSDDM	X					X	X			X	X	X	X	Include Training for all Users
NOAA-2 ASOS		X			X		X			X	X	X	X	
AF-2 OS-21		X			X			X					X	
Army-1 IRP		X				X		X		X	X	X	X	Include Training for all Users
IND-4 FFDI		X				X	X			X	X	X	X	Include Training for all Users

operations. Current training on FFDI includes air traffic controllers and ground operations personnel. In order to support this initiative, the training could be modified to meet the training requirements of pilots as well. The training component of one other program could possibly

provide useful training in the area. The Army’s Icing Research Program (IRP) is working on a capability to remotely detect icing conditions ahead of the aircraft and is also developing methods to rapidly de-ice helicopters during pre-flight. Training is under development and with the training needs of air traffic controllers, ground crews, and pilots in mind, could be developed to support this initiative.

Service Area (5): In-Flight Icing
Initiative # 5: Training on In-Flight Icing Hazards for Operators of all Types of Aircraft

The third initiative deals with training on in-flight icing hazards for operators of all types of aircraft. Aircraft icing poses a threat to any aircraft but given the short exposure, icing is usually not a problem for jet aircraft. The general aviation community is most at risk since icing generally occurs at those altitudes flown by general aviation aircraft. Depending on the sophistication of the aircraft’s de-icing capability, icing poses varying degrees of danger. In the initial assessment of the Tier 3/4 programs (Table 3, Column 2), two programs appeared to support this initiative; the Air Safety Foundation’s outreach program mentioned above and Education and Training element within NASA’s Aircraft Icing Project. The Air Safety Foundation’s training video guides the pilot through recommended general procedures in dealing

Service Area (5): In-Flight Icing							TABLE 3						
Programs Related to In-Flight Icing	Training Component Supports Initiative?			If no, could it be modified to support initiative?			Training Status			Designated Trainees			Possible Modifications
	yes	no	partial	yes	no	possibly	Implemented	Under Dev	Other	ATC	Operators	Other	
FAA-4 ADDS	X					X	X			X	X		Expand Web-Based Tutorial
FAA-6 IIDA/IIFA	X					X	X			X	X	X	Include Web-Based Tutorial
FAA-20 WARP	X			X			X			X		X	
FAA-23- OASIS	X			X			X			X			
NASA-2 DAT	X			X					X			X	
NASA-3 AIP	X					X			X	X	X		Include Training Segment on In-Flight Icing
NASA-4 E&T	X						X				X		Tailor and leverage to meet all requirements
NASA-6 AWIN	X			X				X			X		
NOAA-1 AIP	X			X				X				X	
NOAA-14 PACE	X			X				X		X			
AF-8 N-TFS	X			X			X			X	X		
Army-1 IRP	X			X				X		X	X	X	
IND-18 Pilot Ed			X				X				X		Expand In-Flight Icing Segment
Univ-1 AWHCS	X					X			X			X	Include In-Flight Icing Tutorial for Users

with in-flight hazards. NASA’s Education and Training element contains computer-based training materials dealing with in-flight icing and its impact on aircraft. As the result of this follow-on training review (Table 3, Column 3), the training component of four other programs may provide useful training in this area. The Aviation Weather Center’s ADDS, mentioned above, provides various products including icing graphics relevant to the aircraft’s flight path. Expansion of the web-based tutorial to deal with icing hazards would assist in meeting this initiative. The FAA’s icing diagnostic and forecast algorithms (IIDA/IIFA) will provide hourly depictions and forecasts of icing to include severity, type, and probability of occurrence. An expanded icing tutorial with this program could provide useful training for pilots. The Aircraft Ice Protection (AIP) element within NASA’s Aircraft Icing Project is developing capabilities to sense and characterize icing conditions and to monitor aircraft performance. The training

segment for this element has yet to be determined but quite clearly could provide useful information to aircraft operators on in-flight icing. Finally, the Aviation Weather Hazard Characterization System (AWHCS) is developing the capability to assimilate multi-sensor observations and generate analyses of aviation weather impact variables including icing. The training segment for this program also has yet to be determined but certainly could be developed to provide valuable information to aircraft operators.

Service Area (5): In-Flight Icing
Initiative #12: Training on In-Flight Icing Hazards for ATC Service Providers

The fourth initiative deals with in-flight icing hazard training for Air Traffic Control (ATC) personnel. Following the first assessment of the Tier 3/4 programs, there were no programs identified to support this initiative. However, based on this follow-on training review (Table 3), three programs appear to have the capability to support this initiative. These are the Aviation Weather Center’s Aviation Digital Data Service (ADDS), the FAA’s icing algorithms (IIDA/IIFA), and NASA’s AIP element. The planned training for these designate ATC personnel as trainees and with modification this training may support this Tier 2 initiative.

Service Area (7): Turbulence
Initiative # 11: Training on Turbulence Hazards for Pilots

Finally, the fifth initiative deals with training on non-convective turbulence hazards for pilots. The turbulence hazards associated with convective storms are well known but equally threatening can be non-convective turbulence associated with such things as wind shear and terrain. During the initial assessment of the Tier 3/4 programs (Table 4, Column 2), one program appeared to partially support this initiative. This was the Air Safety Foundation’s outreach program. The Air Safety Foundation’s outreach program produces training materials dealing

Service Area (7): Turbulence											TABLE 4	
Programs Related to Turbulence	Training Component Supports Initiative?			If no, could it be modified to support initiative?			Training Status			Designated Trainees		Possible Modification
	yes	no	partial	yes	no	possibly	Implemented	Under Dev	Other	Pilots	Other	
FAA-4 ADDS		X				X	X			X	X	Expand Web-Based Tutorial
FAA-8 ITFA		X				X	X			X	X	Include Web-Based Tutorial
NASA-4 E&T		X				X	X			X		Expand to Include Turb
NASA-6 AWIN		X			X			X		X	X	
NASA-9 TDAM		X				X		X		X		Include Web-Based Tutorial
NOAA-4 MWAVE		X			X			X		X	X	
NOAA-14 PACE		X			X			X			X	
IND-2 TPS						X	X			X	X	Tailor for Pilots
IND-13 LIDAR		X				X			X	X		Include Turb Segment
IND-18 Pilot Ed			X				X			X		Expand Turb Trng
Univ-1 AWHCS		X				X			X		X	Include Web-Based Tutorial

with various subjects including flying hazards and is intended for the general aviation pilot community. This follow-on review has identified several other programs (Table 4, Column 3) that could provide useful training in this area. The Aviation Weather Center's Aviation Digital Data Service (ADDS) could support this initiative by expanding its web-based tutorial to include turbulence hazards for pilots. The FAA's Integrated Turbulence Forecast Algorithm (ITFA) program could support this initiative. Although ITFA is primarily an improved turbulence forecasting tool, there may be an opportunity to expand the training segment to improve pilot understanding of turbulence hazards. NASA's Education and Training (E&T) element could be leveraged if it were expanded to include turbulence. NASA's Turbulence Detection and Mitigation (TDAM) program is developing technologies to detect, warn, and mitigate the impacts of turbulence. The training component of this program is under development and could provide pilot training in recognizing and avoiding areas of turbulence.

Industry's Turbulence Plot System (TPS) provides information on en route turbulence and other hazards and has a training component for pilots. Industry's LIDAR program could be useful if it included a training segment on turbulence hazards. The LIDAR program deals with developing on-board detection capabilities. The training component has yet to be defined but could include some pilot training in turbulence hazard detection and avoidance. Finally, the Aviation Weather Hazard Characterization System (AWHCS) is developing the capability to assimilate multi-sensor observations and generate analyses of aviation weather impact variables including turbulence. The training segment for this program also has yet to be determined but certainly could be developed to provide valuable turbulence information to pilots.